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EXAMINER	
BRAUTIGAM, ALYSA N	

ART UNIT	PAPER NUMBER
2676	

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/802,598	FRISKEN ET AL.	
	Examiner	Art Unit	
	Alysa N. Brautigam	2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-70* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-70* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *16 March 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because of the following:

- Figure 7, Item 404 – Appears to be an extraneous item number

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

- Figure 7, Item 750 – Reference to the item is missing, see paragraph 0132
- Figure 8, Item 800
- Figure 13 – Reference to the figure is missing, see paragraph 0112-0113
- Figure 13, Item 1350 – Reference to item is missing, see paragraphs 0112-0115

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

- Page 67, paragraph 0267 – References to "mapping 440" should include reference to Figure 4 to provide coherency
- Page 83, paragraph 0340 – References Item 2020 which is not shown in Figure 20D

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 35, 45, 47-48, 53, and 56-60 are rejected under 35 U.S.C. 102(b) as being anticipated by Frisken et al. ("Adaptively Sampled Distance Fields: A General Representation of Shape for Computer Graphics," SIGGRAPH 2000).

6. In regards to claim 35, Frisken (SIGGRAPH) discloses a method for rendering a region of a composite glyph (page 251, Figures 4a-d disclose the composite glyph), comprising:

- defining a composite glyph by a set of elements (page 251, Figures 4a-d disclose the object ["R"] where Figure 4d discloses the set of elements defining the composite glyph);
- generating a set of two-dimensional distance fields using the set of elements (page 251, Figures 4a-d discloses the set of elements of a two-dimensional distance field representing the glyph; section 3.3 – "Reconstructing ADFs"; page 250, Section 3.1, second paragraph, lines 3-5), wherein each two-dimensional distance field in the set of two-dimensional distance fields is partitioned into cells (page 251, Figures 4a-

d disclose the glyph ["R"] partitioned into cells), each cell including a method for reconstructing the corresponding two-dimensional distance field within the cell (page 251, section 3.3 – "Reconstructing ADFs", lines 1-2), a composition of the set of two-dimensional distance fields representing the composite glyph (Figures 4a-d); and

- rendering a region of the composite glyph using the set of two-dimensional distance fields (page 251, section 3.3 – Reconstructing ADFs, lines 5-9 disclose the use of distance fields for rendering).

7. In regards to claim 45, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. In addition, Frisken discloses wherein a particular element in the set of elements is a distance field (Section 2.1 – ADFs, first paragraph).

8. In regards to claim 47, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. In addition, Frisken discloses wherein a particular element in the set of elements is an adaptively sampled distance field (Section 2.1 – ADFs, first paragraph; Section 3. – "Adaptive Distance Fields" and, in particular, right column, lines 25-28).

9. In regards to claim 48, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. In addition, Frisken discloses wherein a particular element in the set of elements is a procedure (page 251, Section 3.3 – "Reconstructing ADFs", lines 7 discloses "processing an ADF" where it is inherent that, if a process is occurring, then a procedure must be driving it).

10. In regards to claim 53, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. In addition, Frisken discloses wherein the defining is performed automatically by a procedure (page 251, section 3.2 - Generating ADFs, paragraphs 4-5 discuss the two procedure algorithms – "top-down approach" and "bottom-up").

11. In regards to claim 56, Frisken (SIGGRAPH) discloses the method of claim 35 wherein the defining further comprises determining a shape descriptor for a particular element in the set of elements and determining a distance function for the shape descriptor to define the particular element (page 250, Section 3. – "Adaptive Distance Fields and, in particular, right column, lines 25-28).

12. In regards to claim 57, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. In addition, Frisken discloses wherein the defining determines the set of elements from a distance field of a shape descriptor for the composite glyph (pages 250-251, section 3.1 – Octree-based ADFs, paragraphs 2-4 disclose the defining determines the set of elements from a distance field of a shape descriptor [corner, edges, curves]).

13. In regards to claim 58, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. In addition, Frisken discloses wherein a particular two-dimensional distance field in the set of two-dimensional distance fields is an adaptively sampled distance field (page 250, Section 3. – "Adaptive Distance Fields and, in particular, right column, lines 25-28).

14. In regards to claim 59, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. In addition, Frisken discloses wherein a particular two-dimensional distance field in the set of two-dimensional distance fields comprises a set of distances stored in a memory (page 250, right column, lines 8 and 18-24).

15. In regards to claim 60, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. In addition, Frisken discloses wherein a particular two-dimensional distance field in the set of two-dimensional distance fields is represented by a procedure (Section 2.1 – "ADFs" discloses the two-dimensional distance fields and the "processing" of the data where it is inherent that, if a process is occurring, then a procedure must be driving it).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 1, 9-14, and 16-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frisken et al. ("Adaptively Sampled Distance Fields: A General Representation of Shape for Computer Graphics," SIGGRAPH 2000) in view of Russ ("The Image Processing Handbook, Fourth Edition") in view of Kimmel et al. (United States Patent Publication Number: 2002/0097912) and in further view of Perry et al. ("Kizamu: A System for Sculpting Digital Characters").

18. In regards to claim 1, Frisken (SIGGRAPH) discloses a method for rendering a region of a composite glyph (page 251, Figures 4a-d disclose the composite glyph), comprising:

- defining a composite glyph by a set of elements (page 251, Figures 4a-d disclose the object ["R"] where Figure 4d discloses the set of elements defining the composite glyph);
- generating a set of two-dimensional distance fields using the set of elements (page 251, Figures 4a-d discloses the set of elements of a two-dimensional distance field representing the glyph; section 3.3 – "Reconstructing ADFs"; page 250, Section 3.1, second paragraph, lines 3-5), wherein each two-dimensional distance field in the set of two-dimensional distance fields is partitioned into cells (page 251, Figures 4a-d disclose the glyph ["R"] partitioned into cells), each cell including a method for reconstructing the corresponding two-dimensional distance field within the cell (page 251, section 3.3 – "Reconstructing ADFs", lines 1-2), a composition of the set of two-dimensional distance fields representing the composite glyph (Figures 4a-d); and
- rendering a region of the composite glyph using the set of two-dimensional distance fields (page 251, section 3.3 – Reconstructing ADFs, lines 5-9 disclose the use of distance fields for rendering), the rendering further comprising:

- identifying, for each two-dimensional distance field in the set of two-dimensional distance fields, a set of cells of the two-dimensional distance field, the set of cells associated with the region of the composite glyph (page 251, Figures 4a-d discloses the set of cells of a two-dimensional distance field associated with the region of the composite glyph; section 3.3 – "Reconstructing ADFs" discloses the association between the set of cells and the distance field; page 250, Section 3.1, second paragraph, lines 3-5);
- locating a set of pixels associated with the region (page 252, left column, lines 2-6 disclose the calculations including the x,y,z components such that the location of a set of pixels associated with a region is an inherent action performed by the method); and
    - wherein determining an intensity comprises combining the corresponding distances to determine a combined distance (page 51, section 3.2 - Generating ADFs, paragraph 4, lines 4-13).

While Frisken discloses the partitioning of a two-dimensional distance field into cells representing an object and identifying a set of pixels associated with a region and Frisken further discloses the use of Euclidean distances in the creation of distance fields, Frisken does not specifically disclose specifying a set of components for each pixel nor does Frisken specifically disclose the determination of an anti-aliased intensity for each component of the pixels. Russ discloses the details of Euclidean distance

maps such that determining an antialiased intensity for each pixel in the set of pixels (page 427, lines 6-7 disclose the use of Euclidean distance maps to generate grey-scale images including the determination of an intensity for each pixel). In addition, Russ discloses the determining further comprising determining a distance for the pixel from the set of cells (page 427, lines 7-11 disclose the determination of a distance for the pixel) and mapping the distance to the antialiased intensity of the pixel (page 427, lines 7-11 and 26-30 disclose the mapping of distance to the anti-aliased intensity such that the length of the scalar [distance from end to end] is the anti-aliased intensity of the pixel). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and Russ to achieve a system and method in which 2-dimensional distance maps are partitioned into cells representing an object and wherein the cells contain pixels and the anti-aliased intensity value for each pixel is determined in order to provide an anti-aliased representation of an image that is both visually pleasing to an observer and overcomes the deficiencies of other, similar anti-aliasing methods. While Russ discloses the determination and mapping of an anti-aliased intensity of the pixel, Russ does not specifically disclose the specifying of a set of components for each pixel. Kimmel discloses a method and apparatus of computing sub-pixel Euclidean distance maps such that the Euclidean distance is determined to sub-pixel level (paragraph 0007, lines 2-3; paragraph 0023, lines 1-3; paragraph 0026, lines 10-13; paragraph 0034-0035; paragraph 0061, lines 3-11; paragraph 0113, lines 1-4). Further, it would have been a logical and obvious extension of the method disclosed by the combination of Frisken and Russ to determine

an anti-aliased intensity for each sub-pixel as it is very common for pixels to be composed of sub-pixels, which Applicant refers to as a set of components. Therefore, it would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, and Kimmel to achieve a system and method for anti-aliasing a 2-dimensional distance field to a greater degree of accuracy and with a reduced level of complexity. While the combination of Frisken, Russ, and Kimmel disclose the determination of an antialiased intensity for each component of each pixel, the combination does not specifically disclose wherein the method comprises combining the corresponding distances to determine a combined distance. Perry discloses a method for computer-based sculpting using the method disclosed in Frisken et al. Perry further discloses wherein the disclosed method utilizes an algorithm wherein the distances are combined (section 7.1 - Input From Range Data, paragraphs 3 and 4 where paragraph 4 states the method disclosed in paragraph 3 is adopted by the disclosed method). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a method for anti-aliasing a 2-dimensional distance field to a greater degree of accuracy and with a reduced level of complexity such that there is significant savings in memory requirements and the number of distance computations.

19. In regards to claim 9, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken

discloses wherein a particular element in the set of elements is a distance field (Section 2.1 – ADFs, first paragraph).

20. In regards to claim 10, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, the combination discloses wherein a particular element in the set of elements is a distance map (Kimmel: paragraph 0008, lines 1-3; paragraph 0026, lines 11-13). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method for anti-aliasing a 2-dimensional distance field to a greater degree of accuracy and with a reduced level of complexity.

21. In regards to claim 11, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein a particular element in the set of elements is an adaptively sampled distance field (Section 2.1 – ADFs, first paragraph; Section 3. – "Adaptive Distance Fields" and, in particular, right column, lines 25-28).

22. In regards to claim 12, the combination of Frisken, Russ, Kimmel, and Perry disclose the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein a particular element in the set of elements is a procedure (page 251, Section 3.3 – "Reconstructing ADFs", lines 7 discloses "processing an ADF" where it is inherent that, if a process is occurring, then a procedure must be driving it).

23. In regards to claim 13, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, the

combination discloses wherein a particular element in the set of elements is a distance function (Kimmel: paragraph 0028 discloses the distance function as the point to point distance where paragraph 0026 specifies the point may be a sub-pixel point; paragraphs 0107-0108 disclose the distance function relating the distance value to the anti-aliased intensity, i.e., graylevel value g(d)). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method for anti-aliasing a 2-dimensional distance field to a greater degree of accuracy and with a reduced level of complexity.

24. In regards to claim 14, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. The combination further discloses wherein a particular element in the set of elements is an implicit blend of a first shape descriptor and a second shape descriptor (Frisken discloses the glyph representation where the individual strokes disclosed in Applicant's specification provide the individual elements [edges, corners, rounds, as disclosed with respect to claim 6] which, when combined, form the glyph and are, therefore, an implicit blend of at least a first shape descriptor and a second shape descriptor). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is an implicit blend of a first shape descriptor

and a second shape descriptor as this is a common design feature for the representation of glyphs.

25. In regards to claim 16, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. The combination further discloses wherein a particular element in the set of elements is drawn by a user (Perry: section 3. – "The Sculpting System" discloses wherein a particular element is drawn by a user [generate a "basic form" and sculpt the detailed object]). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein a particular element in the set of elements is drawn by a user in order to meet the demands of high-end production studios for the improvement in the areas of character design for games and for virtual reality.

26. In regards to claim 17, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the defining is performed automatically by a procedure (page 251, section 3.2 - Generating ADFs, paragraphs 4-5 discuss the two procedure algorithms – "top-down approach" and "bottom-up").

27. In regards to claim 18, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. The combination further discloses wherein the defining is performed by a user (Perry: section 3. – "The Sculpting System" discloses wherein the defining is performed by a user). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made

to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the defining is performed by a user in order to meet the demands of high-end production studios for the improvement in the areas of character design for games and for virtual reality.

28. In regards to claim 19, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. The combination further discloses wherein the defining is performed semi-automatically by a procedure and a user (Perry: section 3. – "The Sculpting System" discloses wherein the defining is performed semi-automatically by a procedure and a user). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the defining is performed semi-automatically by a procedure and a user in order to meet the demands of high-end production studios for the improvement in the areas of character design for games and for virtual reality.

29. In regards to claim 20, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the defining further comprises determining a shape descriptor for a particular element in the set of elements and determining a distance function for the shape descriptor to define the particular element (pages 250-251, section 3.1 – Octree-based ADFs, paragraphs 2-4 disclose the defining determines the set of elements from a distance field of a shape descriptor [corner, edges, curves].

30. In regards to claim 21, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the defining determines the set of elements from a distance field of a shape descriptor for the composite glyph (pages 250-251, section 3.1 – Octree-based ADFs, paragraphs 2-4 disclose the defining determines the set of elements from a distance field of a shape descriptor [corner, edges, curves]).

31. In regards to claim 22, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein a particular two-dimensional distance field in the set of two-dimensional distance fields is an adaptively sampled distance field (page 250, Section 3. – "Adaptive Distance Fields and, in particular, right column, lines 25-28).

32. In regards to claim 23, the combination of Frisken, Russ, Kimmel, and Perry disclose the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein a particular two-dimensional distance field in the set of two-dimensional distance fields comprises a set of distances stored in a memory (page 250, right column, lines 8 and 18-24).

33. In regards to claim 24, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein a particular two-dimensional distance field in the set of two-dimensional distance fields is represented by a procedure (Section 2.1 – "ADFs" discloses the two-dimensional distance fields and the "processing" of the data where it is inherent that, if a process is occurring, then a procedure must be driving it).

34. In regards to claim 25, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, the combination discloses wherein the combining performs a maximum of the corresponding distances to determine the combined distance (Perry: section 5.4 – Correcting the Remote Field, first paragraph, lines 2-6 disclose the additive calculation where the combining performs a maximum). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the combining performs a difference calculation as this is a common method following the positive-inside / negative-outside sign convention to represent the correction of distance field values.

35. In regards to claim 26, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the combining performs an arithmetic average of the corresponding distances to determine the combined distance (pages 251-252, section 3.3 "Reconstructing ADFs" discloses the performance of an arithmetic average of the distances [normalization of the distance field] to determine the combined distance).

36. In regards to claim 27, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the combining performs a union of the corresponding distances to determine the combined distance (Figure 4d and pages 250-251, Section 3.1 – "Octree-

based ADFs" discloses the relationship of the cells and union of cells to the region; page 251, Section 3.2 – "Generating ADFs" discloses the "bottom-up" approach).

37. In regards to claim 28, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the combining performs an intersection of the corresponding distances to determine the combined distance (Frisken: page 252, section 4.1 – "Precise Carving", paragraph 2, lines 5-6 disclose intersection).

38. In regards to claim 29, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, the combination discloses wherein the combining performs a difference of the corresponding distances to determine the combined distance (Perry: section 5.4 – Correcting the Remote Field, first paragraph, lines 2-6 disclose the difference calculation). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the combining performs a difference calculation as this is a common method following the positive-inside / negative-outside sign convention to represent the correction of distance field values.

39. In regards to claim 30, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the combining performs an implicit blend of the corresponding distances to determine the combined distance (Frisken: page 252, section 4.1 – "Precise Carving", paragraph 2, lines 6-7 disclose blending).

40. In regards to claim 31, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, the combination discloses wherein the combining performs an arithmetic operation on the corresponding distances to determine the combined distance (Perry: section 5.4 – Correcting the Remote Field, first paragraph, lines 2-6 disclose the arithmetic operations on the corresponding distances). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the combining performs an arithmetic operation on the corresponding distances to determine the combined distance as this is a common method to determine the correction of distance field values.

41. In regards to claim 32, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the combining performs a conditional operation on the corresponding distances to determine the combined distance (Section 3.1 – "Octree-based ADFs" discloses the relationship of the cells and union of cells to the region; page 251, Section 3.2 – "Generating ADFs" discloses the "bottom-up" and "top-down" approaches and where these two approaches use conditional operations).

42. In regards to claim 33, the combination of Frisken, Russ, and Kimmel discloses the method of claim 1, as contained hereinabove. In addition, the combination discloses wherein the combining uses a procedure to determine the combined distance (Perry: section 5.4 – Correcting the Remote Field, first paragraph, lines 2-6 disclose the

application of CSG operations to determine the combined distances; section 3 – "The Sculpting System" discloses where the CSG operations are procedures). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the combining uses a procedure to determine the combined distance as this is a common method to determine the correction of distance field values.

43. In regards to claim 34, the combination of Frisken, Russ, and Kimmel discloses the method of claim 1, as contained hereinabove. In addition, Frisken discloses wherein the combining uses a table to determine the combined distance (section 3.2 - "Generating ADFs" discloses the use of the octree to determine the distance; section 3 – "Adaptive Distance Fields", paragraph 3 discloses wherein an octree is a data structure where a data structure can be broadly interpreted as a table).

44. Claims 2-8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frisken et al. ("Adaptively Sampled Distance Fields: A General Representation of Shape for Computer Graphics," SIGGRAPH 2000) in view of Russ ("The Image Processing Handbook, Fourth Edition") in view of Kimmel et al. (United States Patent Publication Number: 2002/0097912) in view of Perry et al. ("Kizamu: A System for Sculpting Digital Characters") and in further view of Applicant's specification.

45. In regards to claim 2, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. While the combination

discloses a composite glyph represented by a set of elements, the combination does not specifically disclose wherein a particular element in the set of elements is a stroke. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements of the glyph is a stroke (paragraphs 0005 and 0026). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a stroke as this is a common design feature for the representation of glyphs.

46. In regards to claim 3, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. While the combination discloses a composite glyph represented by a set of elements, the combination does not specifically disclose wherein a particular element in the set of elements is an outline. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is an outline (paragraphs 0006 and 0011). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular

element in the set of elements is an outline as this is a common design feature for the representation of glyphs.

47. In regards to claim 4, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. While the combination discloses a composite glyph represented by a set of elements, the combination does not specifically disclose wherein a particular element in the set of elements is a radical. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a radical (paragraphs 0026). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a radical as this is a common design feature for the representation of glyphs.

48. In regards to claim 5, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. While the combination discloses a composite glyph represented by a set of elements, the combination does not specifically disclose wherein a particular element in the set of elements is a stroked radical. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a stroked radical (paragraphs 0026). It would have been obvious to one

skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a stroked radical as this is a common design feature for the representation of glyphs.

49. In regards to claim 6, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. While the combination discloses a composite glyph represented by a set of elements, the combination does not specifically disclose wherein a particular element in the set of elements is a two-dimensional shape descriptor. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a two-dimensional shape descriptor (paragraphs 0003-0005). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a two-dimensional shape descriptor as this is a common design feature for the representation of glyphs.

50. In regards to claim 7, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. While the combination discloses a composite glyph represented by a set of elements, the combination does

not specifically disclose wherein a particular element in the set of elements is a one-dimensional shape descriptor. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a one-dimensional shape descriptor (paragraphs 0005 and 0026). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a stroke as this is a common design feature for the representation of glyphs.

51. In regards to claim 8, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. While the combination discloses a composite glyph represented by a set of elements, the combination does not specifically disclose wherein a particular element in the set of elements is a path. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a path (paragraphs 0021, 00154 and 0261). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular

element in the set of elements is a path as this is a common design feature for the representation of glyphs.

52. In regards to claim 15, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 1, as contained hereinabove. While the combination discloses a composite glyph represented by a set of elements, the combination does not specifically disclose wherein a particular element in the set of elements is a skeletal descriptor with a corresponding offset descriptor. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a path (paragraphs 0021, 00154, 0261, and 0314). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a path as this is a common design feature for the representation of glyphs.

53. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frisken et al. ("Adaptively Sampled Distance Fields: A General Representation of Shape for Computer Graphics," SIGGRAPH 2000) in view of Russ ("The Image Processing Handbook, Fourth Edition") and in further view of Kimmel et al. (United States Patent Publication Number: 2002/0097912).

54. In regards to claim 36, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. Frisken also discloses wherein the rendering further comprises:

- identifying, for each two-dimensional distance field in the set of two-dimensional distance fields, a set of cells of the two-dimensional distance field, the set of cells associated with the region of the composite glyph (page 251, Figures 4a-d discloses the set of cells of a two-dimensional distance field associated with the region of the composite glyph; section 3.3 - "Reconstructing ADFs" discloses the association between the set of cells and the distance field; page 250, Section 3.1, second paragraph, lines 3-5);
- locating a set of pixels associated with the region (page 252, left column, lines 2-6 disclose the calculations including the x,y,z components such that the location of a set of pixels associated with a region is an inherent action performed by the method);

While Frisken discloses the partitioning of a two-dimensional distance field into cells representing an object and identifying a set of pixels associated with a region and Frisken further discloses the use of Euclidean distances in the creation of distance fields, Frisken does not specifically disclose specifying a set of components for each pixel nor does Frisken specifically disclose the determination of an anti-aliased intensity for each component of the pixels. Russ discloses the details of Euclidean distance maps such that determining an antialiased intensity for each pixel in the set of pixels (page 427, lines 6-7 disclose the use of Euclidean distance maps to generate grey-

scale images including the determination of an intensity for each pixel). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and Russ to achieve a system and method in which 2-dimensional distance maps are partitioned into cells representing an object and wherein the cells contain pixels and the anti-aliased intensity value for each pixel is determined in order to provide an anti-aliased representation of an image that is both visually pleasing to an observer and overcomes the deficiencies of other, similar anti-aliasing methods. While Russ discloses the determination and mapping of an anti-aliased intensity of the pixel, Russ does not specifically disclose the specifying of a set of components for each pixel. Kimmel discloses a method and apparatus of computing sub-pixel Euclidean distance maps such that the Euclidean distance is determined to sub-pixel level (paragraph 0007, lines 2-3; paragraph 0023, lines 1-3; paragraph 0026, lines 10-13; paragraph 0034-0035; paragraph 0061, lines 3-11; paragraph 0113, lines 1-4). Further, it would have been a logical and obvious extension of the method disclosed by the combination of Frisken and Russ to determine an anti-aliased intensity for each sub-pixel as it is very common for pixels to be composed of sub-pixels, which Applicant refers to as a set of components. Therefore, it would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, and Kimmel to achieve a system and method for anti-aliasing a 2-dimensional distance field to a greater degree of accuracy and with a reduced level of complexity.

55. Claims 37 and 61-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frisken et al. ("Adaptively Sampled Distance Fields: A General Representation of Shape for Computer Graphics," SIGGRAPH 2000) in view of Russ ("The Image Processing Handbook, Fourth Edition") in view of Kimmel et al. (United States Patent Publication Number: 2002/0097912) and in further view of Perry et al. ("Kizamu: A System for Sculpting Digital Characters").

56. In regards to claim 37, the combination of Frisken, Russ, and Kimmel discloses the method of claim 36, as contained hereinabove. In addition, the combination discloses the determining further comprising determining a distance for the pixel from the set of cells (Russ: page 427, lines 7-11 disclose the determination of a distance for the pixel) and mapping the distance to the antialiased intensity of the pixel (Russ: page 427, lines 7-11 and 26-30 disclose the mapping of distance to the anti-aliased intensity such that the length of the scalar [distance from end to end] is the anti-aliased intensity of the pixel). While the combination of Frisken, Russ, and Kimmel disclose the determination of an antialiased intensity for each component of each pixel, the combination does not specifically disclose wherein the method comprises combining the corresponding distances to determine a combined distance. Perry discloses a method for computer-based sculpting using the method disclosed in Frisken et al. Perry further discloses wherein the disclosed method utilizes an algorithm wherein the distances are combined (section 7.1 - Input From Range Data, paragraphs 3 and 4 where paragraph 4 states the method disclosed in paragraph 3 is adopted by the disclosed method). It would have been obvious to one skilled in the art to which it pertains at the time the

invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a method for anti-aliasing a 2-dimensional distance field to a greater degree of accuracy and with a reduced level of complexity such that there is significant savings in memory requirements and the number of distance computations.

57. In regards to claim 61, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, the combination discloses wherein the combining performs a maximum of the corresponding distances to determine the combined distance (Perry: section 5.4 – Correcting the Remote Field, first paragraph, lines 2-6 disclose the additive calculation where the combining performs a maximum). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the combining performs a difference calculation as this is a common method following the positive-inside / negative-outside sign convention to represent the correction of distance field values.

58. In regards to claim 62, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, Frisken discloses wherein the combining performs an arithmetic average of the corresponding distances to determine the combined distance (pages 251-252, section 3.3 "Reconstructing ADFs" discloses the performance of an arithmetic average of the distances [normalization of the distance field] to determine the combined distance).

59. In regards to claim 63, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, Frisken discloses wherein the combining performs a union of the corresponding distances to determine the combined distance (Figure 4d and pages 250-251, Section 3.1 – "Octree-based ADFs" discloses the relationship of the cells and union of cells to the region; page 251, Section 3.2 – "Generating ADFs" discloses the "bottom-up" approach).

60. In regards to claim 64, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, Frisken discloses wherein the combining performs an intersection of the corresponding distances to determine the combined distance (Frisken: page 252, section 4.1 – "Precise Carving", paragraph 2, lines 5-6 disclose intersection).

61. In regards to claim 65, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, the combination discloses wherein the combining performs a difference of the corresponding distances to determine the combined distance (Perry: section 5.4 – Correcting the Remote Field, first paragraph, lines 2-6 disclose the difference calculation). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the combining performs a difference calculation as this is a common method following the positive-inside / negative-outside sign convention to represent the correction of distance field values.

62. In regards to claim 66, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, Frisken discloses wherein the combining performs an implicit blend of the corresponding distances to determine the combined distance (Frisken: page 252, section 4.1 – "Precise Carving", paragraph 2, lines 6-7 disclose blending).

63. In regards to claim 67, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, the combination discloses wherein the combining performs an arithmetic operation on the corresponding distances to determine the combined distance (Perry: section 5.4 – Correcting the Remote Field, first paragraph, lines 2-6 disclose the arithmetic operations on the corresponding distances). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the combining performs an arithmetic operation on the corresponding distances to determine the combined distance as this is a common method to determine the correction of distance field values.

64. In regards to claim 68, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, Frisken discloses wherein the combining performs a conditional operation on the corresponding distances to determine the combined distance (Section 3.1 – "Octree-based ADFs" discloses the relationship of the cells and union of cells to the region; page 251, Section

3.2 – "Generating ADFs" discloses the "bottom-up" and "top-down" approaches and where these two approaches use conditional operations).

65. In regards to claim 69, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, the combination discloses wherein the combining uses a procedure to determine the combined distance (Perry: section 5.4 – Correcting the Remote Field, first paragraph, lines 2-6 disclose the application of CSG operations to determine the combined distances; section 3 – "The Sculpting System" discloses where the CSG operations are procedures). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, and Perry to achieve a system and method wherein the combining uses a procedure to determine the combined distance as this is a common method to determine the correction of distance field values.

66. In regards to claim 70, the combination of Frisken, Russ, Kimmel, and Perry discloses the method of claim 37, as contained hereinabove. In addition, Frisken discloses wherein the combining uses a table to determine the combined distance (section 3.2 - "Generating ADFs" discloses the use of the octree to determine the distance; section 3 – "Adaptive Distance Fields", paragraph 3 discloses wherein an octree is a data structure where a data structure can be broadly interpreted as a table).

67. Claims 38-44 and 50-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frisken et al. ("Adaptively Sampled Distance Fields: A General

Representation of Shape for Computer Graphics," SIGGRAPH 2000) in view of Applicant's specification.

68. In regards to claim 38, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a stroke. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements of the glyph is a stroke (paragraphs 0005 and 0026). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a stroke as this is a common design feature for the representation of glyphs.

69. In regards to claim 39, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is an outline. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is an outline (paragraphs 0006 and 0011). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and what is well-known in the

art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is an outline as this is a common design feature for the representation of glyphs.

70. In regards to claim 40, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a radical. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a radical (paragraphs 0026). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a radical as this is a common design feature for the representation of glyphs.

71. In regards to claim 41, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a stroked radical. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a stroked radical (paragraphs 0026).

It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a stroked radical as this is a common design feature for the representation of glyphs.

72. In regards to claim 42, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a two-dimensional shape descriptor. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a two-dimensional shape descriptor (paragraphs 0003-0005). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a stroke as this is a common design feature for the representation of glyphs.

73. In regards to claim 43, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a one-dimensional shape descriptor. However, Applicant's

specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a one-dimensional shape descriptor (paragraphs 0005 and 0026). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a stroke as this is a common design feature for the representation of glyphs.

74. In regards to claim 44, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a path. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is a path (paragraphs 0021, 00154 and 0261). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a path as this is a common design feature for the representation of glyphs.

75. In regards to claim 50, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a

set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is an implicit blend of a first shape descriptor and a second shape descriptor. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of elements is an implicit blend of a first shape descriptor and a second shape descriptor (Frisken discloses the glyph representation where the individual strokes disclosed in Applicant's specification provide the individual elements [edges, corners, rounds, as disclosed with respect to claim 6] which, when combined, form the glyph and are, therefore, an implicit blend of at least a first shape descriptor and a second shape descriptor). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is an implicit blend of a first shape descriptor and a second shape descriptor as this is a common design feature for the representation of glyphs.

76. In regards to claim 51, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses a composite glyph represented by a set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a skeletal descriptor with a corresponding offset descriptor. However, Applicant's specification, in the discussion of prior art, provides various definitions of glyphs and their elements such that a particular element in the set of

elements is a path (paragraphs 0021, 0154, 0261, and 0314). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken, Russ, Kimmel, Perry, and what is well-known in the art as disclosed by Applicant's specification in order to achieve a method wherein a glyph is represented by a distance field is comprised of a set of elements and a particular element in the set of elements is a path as this is a common design feature for the representation of glyphs.

77. Claims 46 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frisken et al. ("Adaptively Sampled Distance Fields: A General Representation of Shape for Computer Graphics," SIGGRAPH 2000) in view of Kimmel et al. (United States Patent Publication Number: 2002/0097912).

78. In regards to claim 46, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses the set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a distance map. Kimmel discloses a method and apparatus of computing sub-pixel Euclidean distance maps wherein a particular element in the set of elements is a distance map (Kimmel: paragraph 0008, lines 1-3; paragraph 0026, lines 11-13). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and Kimmel to achieve a system and method for anti-aliasing a two-dimensional distance field to a greater degree of accuracy and with a reduced level of complexity.

79. In regards to claim 49, Frisken (SIGGRAPH) discloses the method of claim 35, as contained hereinabove. While Frisken discloses the set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is a distance function. Kimmel discloses a method and apparatus of computing sub-pixel Euclidean distance maps wherein a particular element in the set of elements is a distance function (Kimmel: paragraph 0028 discloses the distance function as the point to point distance where paragraph 0026 specifies the point may be a sub-pixel point; paragraphs 0107-0108 disclose the distance function relating the distance value to the anti-aliased intensity, i.e., graylevel value g(d)). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and Kimmel to achieve a system and method for anti-aliasing a two-dimensional distance field to a greater degree of accuracy and with a reduced level of complexity.

80. Claims 52, 54, and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frisken et al. ("Adaptively Sampled Distance Fields: A General Representation of Shape for Computer Graphics," SIGGRAPH 2000) in view of Perry et al. ("Kizamu: A System for Sculpting Digital Characters").

81. In regards to claim 52, Frisken discloses the method of claim 35, as contained hereinabove. While Frisken discloses the set of elements, Frisken does not specifically disclose wherein a particular element in the set of elements is drawn by a user. Perry discloses improvements upon the ADF methods disclosed by Frisken including wherein a particular element in the set of elements is drawn by a user (Perry: section 3. – "The

Sculpting System" discloses wherein a particular element is drawn by a user [generate a "basic form" and sculpt the detailed object]). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and Perry to achieve a system and method wherein a particular element in the set of elements is drawn by a user in order to meet the demands of high-end production studios for the improvement in the areas of character design for games and for virtual reality.

82. In regards to claim 54, Frisken discloses the method of claim 35, as contained hereinabove. While Frisken discloses the set of elements, Frisken does not specifically disclose wherein the defining is performed by a user. Perry discloses improvements upon the ADF methods disclosed by Frisken including wherein the defining is performed by a user (Perry: section 3. – "The Sculpting System" discloses wherein the defining is performed by a user). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and Perry to achieve a system and method wherein the defining is performed by a user in order to meet the demands of high-end production studios for the improvement in the areas of character design for games and for virtual reality.

83. In regards to claim 55, Frisken discloses the method of claim 35, as contained hereinabove. While Frisken discloses the set of elements, Frisken does not specifically disclose wherein the defining is performed semi-automatically by a procedure and a user. Perry discloses improvements upon the ADF methods disclosed by Frisken including wherein the defining is performed semi-automatically by a procedure and a

user (Perry: section 3. – "The Sculpting System" discloses wherein the defining is performed semi-automatically by a procedure and a user). It would have been obvious to one skilled in the art to which it pertains at the time the invention was made to integrate the teachings of Frisken and Perry to achieve a system and method wherein the defining is performed semi-automatically by a procedure and a user in order to meet the demands of high-end production studios for the improvement in the areas of character design for games and for virtual reality.

Conclusion

84. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alysa N. Brautigam whose telephone number is 703-305-8631. The examiner can normally be reached on 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 703-308-6829. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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anb

Kee M. Tung
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